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Transparent Calibrated Moisture Boot For UH-60 Pitch Trim Actuator

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13. SUPPLEMENTARY NOTES

14. ABSTRACT

The UH-60 Black Hawk Helicopter Pitch Trim Actuator manufactured by MOOG Inc. Aircraft Group currently utilizes a black opaque dust and moisture boot for protecting a rotating shaft and seal. During normal operation, hydraulic fluid can seep past the seal and collect in the boot. Currently, there is no way to determine the amount of fluid that has collected in the boot. This fluid will continue to collect in the boot until a sufficient quantity is accumulated to detach the boot from its seat on the Pitch Trim Actuator end cap, ultimately spilling hydraulic fluid on the upper flight deck. Once the hydraulic fluid is detected on the flight deck, the Pitch Trim Actuator is assumed to be unserviceable and consequently turned in for repair. It is estimated that 20% of the Pitch Trim Actuators turned in for this reason are still serviceable. The NCDMM, working together with Alliance Partner Polymer Technologies Incorporated (PTI), set out to develop a transparent calibrated moisture boot for the Pitch Trim Actuator. This calibrated boot will allow for a visual inspection to measure the fluid seepage as a function of flight hours to determine Pitch Trim Actuator serviceability.

15. SUBJECT TERMS
UH-60 Black Hawk Helicopter Pitch Trim Actuator; Alliance Partner Polymer Technologies Incorporated; NCDMM; Success Stories

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Transparent Calibrated Moisture Boot For UH-60 Pitch Trim Actuator

NCDMM Project No. 07-0125-01

Technical Report

PROBLEM / OBJECTIVE

The UH-60 Black Hawk Helicopter Pitch Trim Actuator manufactured by MOOG Inc. Aircraft Group currently utilizes a black opaque dust and moisture boot for protecting a rotating shaft and seal. During normal operation, hydraulic fluid can seep past the seal and collect in the boot. Currently, there is no way to determine the amount of fluid that has collected in the boot. This fluid will continue to collect in the boot until a sufficient quantity is accumulated to detach the boot from its seat on the Pitch Trim Actuator end cap, ultimately spilling hydraulic fluid on the upper flight deck. Once the hydraulic fluid is detected on the flight deck, the Pitch Trim Actuator is assumed to be unserviceable and consequently turned in for repair. It is estimated that 20% of the Pitch Trim Actuators turned in for this reason are still serviceable.

The NCDMM, working together with Alliance Partner Polymer Technologies Incorporated (PTI), set out to develop a transparent calibrated moisture boot for the Pitch Trim Actuator. This calibrated boot will allow for a visual inspection to measure the fluid seepage as a function of flight hours to determine Pitch Trim Actuator serviceability.

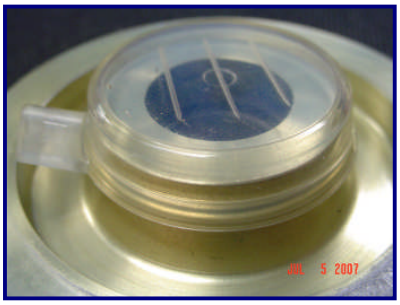
ACCOMPLISHMENTS / PAYOFF

Single Cavity Injection Mold

Process Improvement

Polymer Technologies Inc. designed a single cavity injection mold configured to produce a transparent boot. This tool was fabricated and delivered to PTI for development of the boot.

PTI worked closely with representatives from AMRDEC, SAIC and material suppliers to determine optimal material for the transparent moisture boot. Once the material had been selected, PTI developed the appropriate molding parameters in order to successfully mold the transparent calibrated moisture boot.



Transparent Calibrated Moisture Boot

Implementation and Technology Transfer

The transparent calibrated moisture boots produced are currently being flight-tested.

Expected Benefits

Based on historical overhaul data, the implementation of this boot is expected to reduce the number of serviceable Pitch Trim Actuators turned in for overhaul prematurely by 20%. With an average monthly demand (AMD) of 37.8 units at an average overhaul cost (AOC) of $12,064, the projected yearly cost avoidance is estimated to be $1,094,446. This equates to a savings of over $20M for the life of the program.

TIME LINE / MILESTONE

Start Date……January 07
End Date……June 07

PROJECT FUNDING

NCDMM Funding……$35K

PARTICIPANTS

Polymer Technologies Incorporated
NCDMM

For additional information concerning this project, contact the NCDMM at www.ncdmm.org